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Review

Efficacy and feasibility of opioids for burn analgesia: An evidence-based qualitative review of randomized controlled trials

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ABSTRACT

Opioids are commonly used for burn analgesia, but no comprehensive reviews have been published on such use. We aimed to assess the literature regarding the effectiveness and side effects of opioids both in adult and pediatric burn patients. We conducted a systematic search of the PubMed, Embase, Cochrane, and Web of Science databases. Information on study characteristics, results, and interventions was extracted. The review identified nine studies that satisfied the inclusion criteria. Burn sizes of patients ranged from 1% to 62% of the body. The examined studies showed that dressing or cream containing morphine could potentially decrease pain, use of analgesics, and side effects associated with systemic opioid medications compared with control groups. Oral transmucosal fentanyl citrate (OTFC) was equivalent, or even preferable, to oral morphine, hydromorphone, and oxycodone in provision of analgesia for burn wound care in pediatric patients. Intranasal fentanyl (INF) was equivalent to oral morphine in burn wound care both in adult and pediatric patients. OTFC and INF could be considered as viable non-invasive analgesic alternatives to oral opioids for procedural burn pain. However, the level of evidence still seems quite uncertain because of the limited sample size.

Contents

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1. Introduction

Burns have become a major public health concern impacting the healthcare system, and a financial burden to society, because of the high associated morbidity and mortality [1]. Management of burn injuries is highly challenging, as it may cause severe pain that is equivalent to, or even worse than, the initial burn pain. Therefore, pain control is imperative and seems to be a fundamental element of burn care procedures such as dressing changes, tubbing, debriding, and skin grafting.

Currently, the cornerstone of burn pain treatment relies on a pharmacological approach, and the gold standard of burn analgesia is opioid therapy, in particular, use of μ-receptor agonists such as morphine [1,2]. Topically applied opioids are reported to provide a quick-acting and long-lasting analgesic effect in reducing pain associated with leg ulcers and chronic inflammatory skin conditions [3–6]. Several studies have tested whether topical opioids could also significantly reduce pain associated with partial- or full-thickness burns [7–9].

However, to our knowledge, no comprehensive qualitative reviews have been published on the specific utility of opioids for burn pain. We therefore aimed to summarize the effectiveness and side-effect profile of opioids in adult and pediatric burn patients. We identified and analyzed outcome parameters such as burn-care-related pain and anxiety, use of analgesics, and side effects.

2. Material and methods

2.1. Data sources and search strategy

We conducted a systematic search of the PubMed, Embase, Cochrane, and Web of Science databases, using terms such as "burn" or "opioid," in May 2017 to identify available data sources. The Supplemental Table shows the details of the search strategies. Only studies in English were included in the review. Further relevant trials were obtained by manually searching the conference abstracts and reference lists of all identified related publications to avoid omitting relevant randomized controlled trials (RCTs).

2.2. Selection criteria

Studies were identified based on the following inclusion criteria: (1) RCTs evaluating all opioids for treatment of burn-related pain; (2) RCTs comparing opioids with a placebo, each other, or other pharmacological treatments; and (3) RCTs, irrespective of the type of administration, setting, or phase of burn care, reporting complete efficacy outcomes.

The exclusion criteria were: (1) reviews, case reports, dissertations, animal studies, or duplicate secondary analyses; (2) studies unavailable in English; and (3) studies from which no data could be extracted.

2.3. Data extraction and analysis

Two of the present study's authors assessed article titles and abstracts to independently judge whether trials fulfilled the inclusion criteria. Candidate articles were then retrieved in full and verified for eligibility. Data extracted from the RCTs included study designs, participants' characteristics, and outcomes. All disagreements were resolved by consensus among the authors. A narrative approach was adopted for analyzing the findings of the included studies because of the heterogeneity of trials and limited reporting of data. The methodological quality of trials was assessed by using the "risk of bias" tool developed by the Cochrane Collaboration [10] (Fig. 2).

3. Results

3.1. Study selection and characteristics

Through the initial database search, 654 studies were analyzed. Nine studies passed the inclusion and exclusion criteria and were identified for further data extraction [7–9,11–16] (Fig. 1).

Table 1summarizes the general characteristics of the included studies, which were published between 1989 and 2007. Sample sizes of these trials ranged from 4 to 88 participants, and totaled 285 participants. Five trials focused on adults [7–9,11,15], four focused on children [12–14,16], three compared opioids with a placebo [7–9], and six compared opioids with each other [11–16]. Secondary

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